

What is claimed is:

1. A method for tuning a PID controller, wherein the PID controller is comprised in a closed PID control loop system, the PID control loop receiving an input, the PID controller being coupled to an object system being controlled, wherein the object system outputs process variables which is supplied for comparison to the input, wherein a result of said comparison is supplied to the PID controller, the method comprising the steps of:

inducing equivalent relationships between PID gains of the PID controller and parameters of time delay control (TDC);

selecting a natural frequency vector and a damping ratio vector so as to acquire a desired error dynamics of the closed PID control loop system;

selecting a sampling time of the closed PID control loop system;

determining the parameters of TDC on the basis of the natural frequency vector, the damping ratio vector and a closed loop stability condition for TDC; and

selecting PID gains of the PID controller on the basis of the equivalent relationships.

2. The method as defined in claim 1, wherein the object system being a multi input multi output system of degree  $n$  which is expressed in a sampled data system.

3. The method as defined in claim 2, wherein the number

of the parameters of TDC is three, a first parameter being determined by the natural frequency vector, a second parameter being determined by the natural frequency vector and damping ratio vector and a third parameter being  
5 determined as a diagonal matrix.

4. The method as defined in claim 3, wherein all of diagonal elements of the third parameter has one constant value.

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5. The method as defined in claim 3, wherein diagonal elements of the third parameter have constant values different to each other.